PEACE/WILLISTON
FISH & WILDLIFE
COMPENSATION
PROGRAM

BC hydro

BRITISH
COLUMBIA

A Reconnaissance Survey Of Otto Lake

A. R. Langston and A. R. McLean
1998

PWFWCP Report No. 133

105-02868/

The Peace/Williston Fish & Wildlife Compensation Program is a cooperative venture of BC Hydro and the provincial fish and wildlife management agencies, supported by funding from BC Hydro. The Program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River, and the subsequent creation of the Williston and Dinosaur Reservoirs.

Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave. 3rd Floor, Prince George B.C. V2L 3H9

Website: *www.bchydro.bc.ca/environment/initiatives/pwcp/*

This report has been approved by the Peace/Williston Fish and Wildlife Compensation Program Fish Technical Committee.

Citation: A. R. Langston and A. R. McLean. 1998. A reconnaissance survey of Otto Lake. Peace/Williston Fish and Wildlife Compensation Program, Report No. 133. 19pp plus appendices.

Author(s): Arne Langston[1] and Allister R. McLean[1]
Address(es): [1] Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave., 3rd Floor Prince George, B.C. V2L 3H9

A RECONNAISSANCE SURVEY OF

OTTO LAKE

WATERSHED:	**Pine River**
DATE OF SURVEY:	**August 10, 11, 1992**
FIELD CREW LEADER:	**A.R. McLean**
FIELD ASSISTANT:	**M. Hunter**

PEACE/WILLISTON FISH AND WILDLIFE
COMPENSATION PROGRAM

B. C. HYDRO

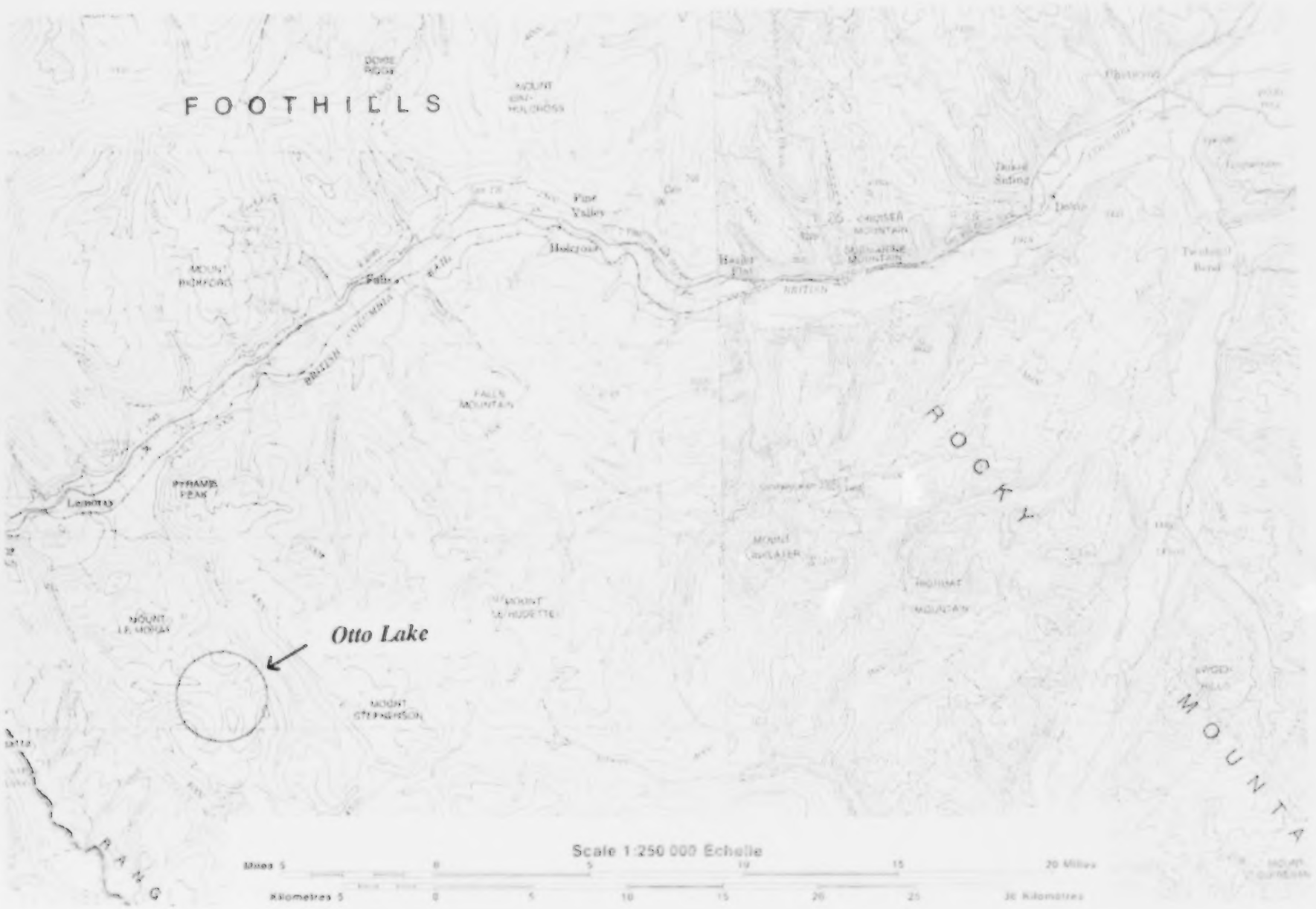
and

MINISTRY OF ENVIRONMENT, LANDS AND PARKS

REPORT PREPARED BY: A.R. Langston and A.R. McLean

RELEASED BY: _____

Nick Baccante, Regional Fisheries Biologist


FOOTHILLS
Otto Lake
ROCKY
MOUNTA
RANG
Scale 1:250 000 Echelle
Miles 5 0 5 10 15 20 Miles
Kilometres 5 0 5 10 15 20 25 30 Kilometres

LAKE: OTTO **SYSTEM NAME: Unnamed C.**

A.S.A.P. REFERENCE NO.: **SYSTEM NO: 234-7988-549**

DATA ON FILE FOR THIS SURVEY

Location	x	Dissolved 02/Temp. Profiles	x
Physical Data	x	Winter Dissolved 02/Temp. Profiles	x
Bench Mark	x	Netting Record	x
Terrain Features	x	Lake Catch Summary	x
Access	x	Individual Fish Data	
Resorts and Campsites	x	Fish Preserved	
Other Developments	x	Stomach Analysis	
Obstructions and Pollutions	x	Scale Reading	
Special Restrictions	x	Location of Inventory Sites	x
Aquatic Plants	x	Photograph Directory	x
Wildlife Observations	x	Appendices:	
Miscellaneous Comments	x	A: Water Chemistry Analysis	x
Lake Drainage	x	B: Tributary Stream Data	x
Fisheries Management Comments	x	Bathymetric Map Reduction	x
History of Previous Surveys	x	Bathymetric Map	
Water Chemistry Summary	x		

LOCATION

Location:	58 km southwest of Chetwynd		
Elevation:	1364 m +/-		
Latitude/Longitude:	55°25'29":122°24'26"	U.T.M.:	10.5375.61419
Management Unit:	7-22	N.T.S. Map No.:	93-0/8

Drainage: Unnamed C. --> LeMoray C. --> Pine R. --> Peace R.

PHYSICAL DATA

Lake Drainage Area:	-- km^2	Volume:	840000 m^3
Water Surface Area:	190000 m^2	Flushing Rate:	--
Area above 6 m contour:	136000 m^2	Perimeter of Islands:	--
Shoreline Perimeter:	2200 m	Number of Islands:	0
Maximum Depth:	11.3 m	Mean Depth:	4.4 m
Filterable Residue (TDS):	42 mg/l	Secchi Reading:	7.2 m
Sounding Device: Lowrance X-1 5		Elevation Source: Contour interpolation	

BENCHMARK

(Iron spike, center of red circle) located on the northeast shore, in a 21 cm diameter spruce tree, 3.Om from water's edge.

High water mark: 0.25 m above water level at time of survey.

TERRAIN FEATURES

Immediate Shoreline:

Shoreline is low to moderately sloped to the water's edge. Otto Lake is treed to the shoreline (spruce, subalpine fir), with the exception of the sedge grass/willow fields located at either ends of the lake. Assorted species of willow and low quantities of wild flowers are scattered along the southwest edge. Shoreline substrate consists of small and large cobble, with fines noted along the south end of the lake. A large shallow shoal (fines) is located along the northwest shore. Lake bottom drops off slowly along the south and northwest shore, but moderately elsewhere. Boating access to shore is fair, with shallows being limiting. Boating access from shore to lake is good.

Surrounding Country:

Otto lake is surrounded by semi-mountainous terrain. Scenic mountain ranges are visible to the north and south. Forest cover consists of subalpine fir and spruce.

Otto lake is located in the Engelmann spruce-subalpine fir biogeoclimatic zone.

ACCESS

Directions:

Otto lake is approximately a 10 minute helicopter flight from Silver Sands Lodge, which is located 70 km west of Chetwynd on Highway 97.

Ground access (cutblock) was noted to within 800m of the northeast (outlet) side of the lake.

Road Type and Conditions:

None.

Restrictions:

None noted.

RESORTS AND CAMPSITES

None.

OTHER DEVELOPMENTS

None.

OBSTRUCTIONS AND POLLUTIONS

Five falls/cascades, located on the initial 200 m of the outlet, are definite barriers to upstream fish passage. Numerous other falls and cascades are present on the outlet and LeMoray Creek (as derived from NTS Map No. 93-08 edition 3), some of which may be barriers to upstream fish passage.

SPECIAL RESTRICTIONS

None Noted.

AQUATIC PLANTS

Sedgegrasses sparsely populated the lake shore. Potamogeton sp. was noted along the southeast shore. No samples were collected.

WILDLIFE OBSERVATIONS

5 water fowl (same species).
Moose and deer tracks.

MISCELLANEOUS COMMENTS

Bathymetry was not collected due to equipment failure at time of survey in 1992. Bathymetric data was collected in 1993.

At the time of survey the lake was known by the unofficial alias name of "Michelle Lake". The Geographical Names Unit of Ministry of Environment, Lands and Parks upon a request/submission from the Chetwynd Environmental Society officially named the waterbody as "Otto" Lake. The name post-humously honours long time Chetwynd resident and trapper of the area, Otto Eldon.

Flagging tape observed on north shore.

Bathymetric Map: The lake outline is from an enlargement of aerial photograph BC7188 No. 234, flown June, 1969.

LAKE DRAINAGE

General:

Otto Lake has 4 inlets (3 seasonal) and one outlet. The outlet flows 2.5 km northeast to LeMoray Creek. LeMoray Creek flows 11.25 km northwest to it's confluence with the Pine River.

Major Systems:

None.

Minor Systems:

Unnamed C. - inlet #1

The initial 250 m of this inlet was investigated. Draining into the northwest shore, this inlet had an average wetted width of 2.2 m, average depth of 0.1 m, field gradient of 1.0% and a water temperature of 7°C, approximately 75 m upstream from the lake. Spawning habitat is poor due to large substrate (cobble), however small pockets of gravel located in faster water were observed in low quantities. The inlet affords good rearing habitat (overstream vegetation, undercut banks). Low gradient was noted for the length of the inlet investigated.

See point sample card for additional information.

Unnamed C. - seasonal inlets(3)

Two seasonal inlets enter from the north and one from the south. These inlets afford no fisheries potential as they are active for only a short period during snow melt.

Unnamed C. - outlet

The initial 200 m of the outlet was investigated. The outlet is located along the northeast shore. A 38 cm (minimum) vertical bedrock face is located at the lake outlet. The outlet flows through the fissures and cracks of the bedrock (Plate 5). The initial 50 m of the creek had an average wetted width of 2.0 m, average depth of 30 cm, a low gradient and a cobble substrate, affording poor spawning, but fair rearing potential. After approximately the first 50 m, the outlet travels 150 m over a series of 6 cascades/falls (largest verticle drop is 8.0 m), which afford no fisheries potential.

FISHERIES MANAGEMENT COMMENTS

An overnight net set, and two minnow traps yielded no fish. The lake is therefore believed to be barren of all fish species. A series of falls/cascades start approximately 50 m downstream of the lake. These falls are definite barriers to upstream fish passage. Numerous other upstream barriers (cascades/falls) are present on the outlet and LeMoray Creek. Inlet #1 affords poor spawning habitat, but good rearing habitat. The initial 50 m of the outlet affords poor spawning, but fair rearing habitat. Oxygen samples taken during the winter of 1990/91 are sufficient for overwintering a fish population.

This subalpine lake is suitable for a sport fish introduction. The outlet may not be a barrier to downstream fish migration, therefore, potential impacts on native fish species in the Pine River drainage should be considered, if this lake is stocked. The cold water temperatures of this lake would likely result in a "stunted" population if species like rainbow trout are introduced. No ground access to the lake was observed, however a cutblock is present to within 800 m of the lake. If fish are introduced into this lake, gravel placement in inlet #1 could enable successful recruitment. This recruitment would result in the creation of a naturalized fish population requiring no further fish introductions. The vertical bedrock face (38 cm in height) at the outlet should not be removed as this may encourage fish to leave the cold lake.

HISTORY OF PREVIOUS SURVEYS

Lake Surveys:

A winter oxygen/temperature series was collected on March 14, 1991 by T. Euchner and R. Tancock, Fish and Wildlife Branch, B.C. Environment, Fort St. John, B.C.

Other Related Surveys:
None known.

WATER CHEMISTRY SUMMARY **Limnology Station No. 1**

Field Conditions:

Date:	August 11, 1992		
Time:	1325 hrs	Air Temperature:	25°C
Wind Velocity:	20 km/hr	Wind Direction:	southeast
Cloud Cover:	1 /10 o.c.	Surface Condition:	ripple
Secchi Disc:	7.2 m	Water Colour:	clear

Method(s) Used:

Dissolved Oxygen:	YSI model 58 oxygen/temperature meter.
Water Temperature:	YSI model 58 oxygen/temperature meter
Air Temperature:	Hand-held alcohol thermometer
Ph (field):	Digital pH pocket tester
H2S (field):	Hach H2S field test kit
Laboratory Used:	Zenon Environmental Inc. B.C. Laboratory Services
Water Sampler:	Verticle Alpha Water Bottle (Vandorn)
Substrate Sampler:	Substrate sample not taken

Water Sample Chemistry: SEAM Site No. Not determined.

	Sampling Depths	
	Surface (0 m)	Lower (10.0 m)
pH (field)	8.6	8.1
pH (lab)	7.3	6.9
Specific Conductance (lab)	62 umhos/cm	62 umhos/cm
Filterable Residue 105°C (lab)	42 mg/l	44 mg/l
H2S (field)	-- mg/l	0.0 mg/l
Bottom Depth:	10.5 m	
Substrate Sample Depth:	m	

Lake: **MICHELLE**

OXYGEN/TEMPERATURE DATA

SUMMER

Crew: A.R. McLean
M. Hunter
Date: August 11, 1992

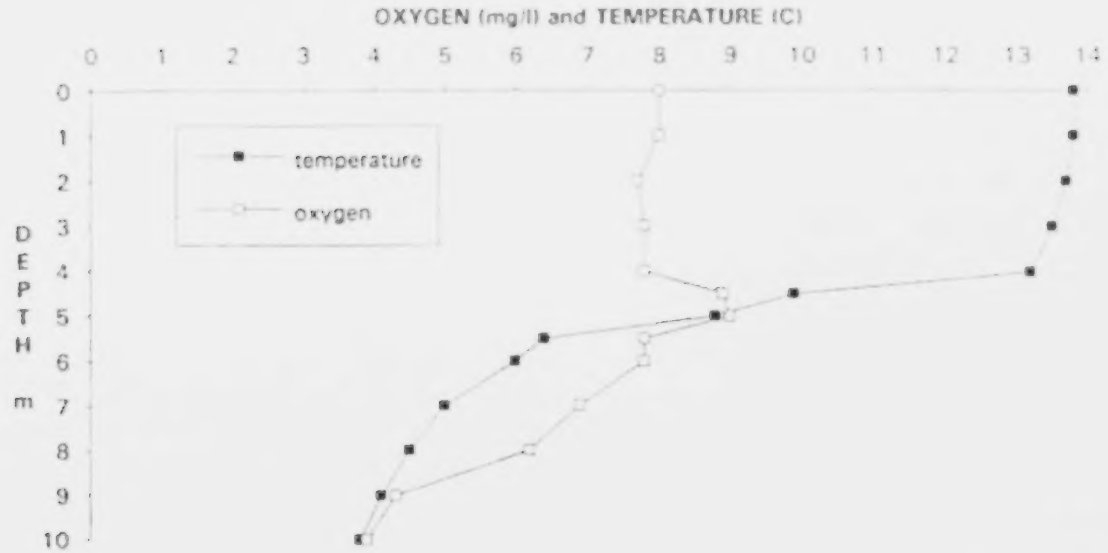
DEPTH (m)	02 (mg/l)	TEMP (° C)
Surface	8.0	13.8
1.0	8.0	13.8
2.0	7.7	13.7
3.0	7.8	13.5
4.0	7.8	13.2
4.5	8.9	9.9
5.0	9.0	8.8
5.5	7.8	6.4
6.0	7.8	6.0
7.0	6.9	5.0
8.0	6.2	4.5
9.0	4.3	4.1
10.0	3.9	3.8
10.5	Bottom	

WINTER

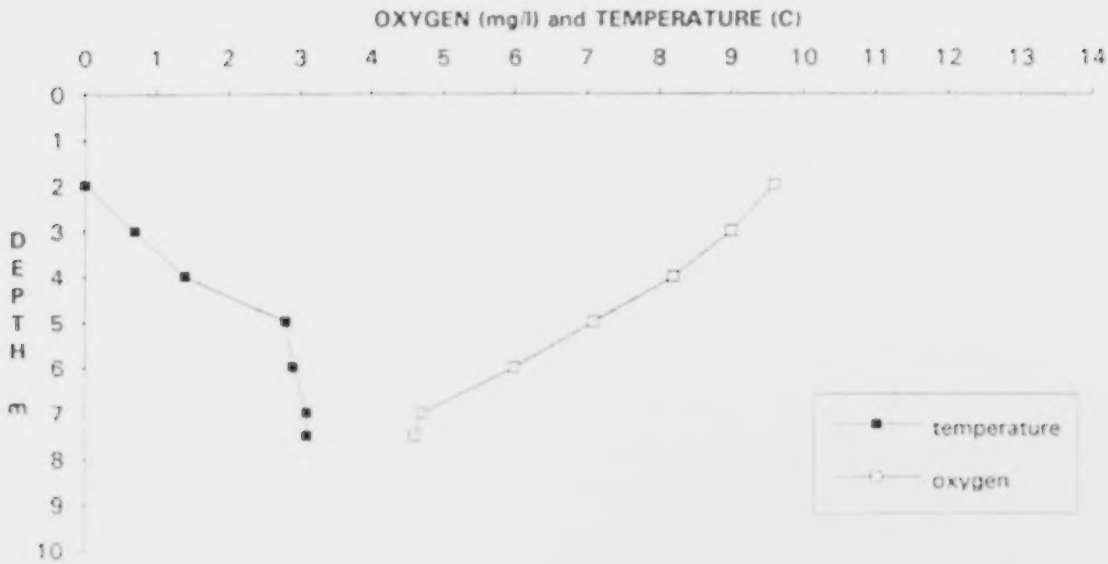
Crew: T. Euchner
R. Tancock
Date: March 14, 1991
Snow depth: 30 cm
Ice Depth: 1.5 m to 1.7 m

DEPTH (m)	02 (mg/l)	TEMP (° C)
Surface		
1.0		
2.0	9.6	0.0
3.0	9.0	0.7
4.0	8.2	1.4
5.0	7.1	2.8
6.0	6.0	2.9
7.0	4.7	3.1
7.5	4.6	3.1
7.7	Bottom	

SUMMER OXYGEN/TEMPERATURE PROFILES



WINTER OXYGEN/TEMPERATURE PROFILES



NETTING RECORD

Mesh sizes experimental order: 25, 76, 51, 89, 38, 64 mm

NETTING SITE #1

Type:	Sinking monofilament		
Date Set:	August 10, 1992	Time:	1930 hrs
Date Lifted:	August 11, 1992	Time:	1008 hrs
Net Dimensions:	Length: 91.4	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth:	1.0 m
		Substrate:	cobble
Deep End Mesh Size:	64 mm	Depth:	7.0 m
		Substrate:	?

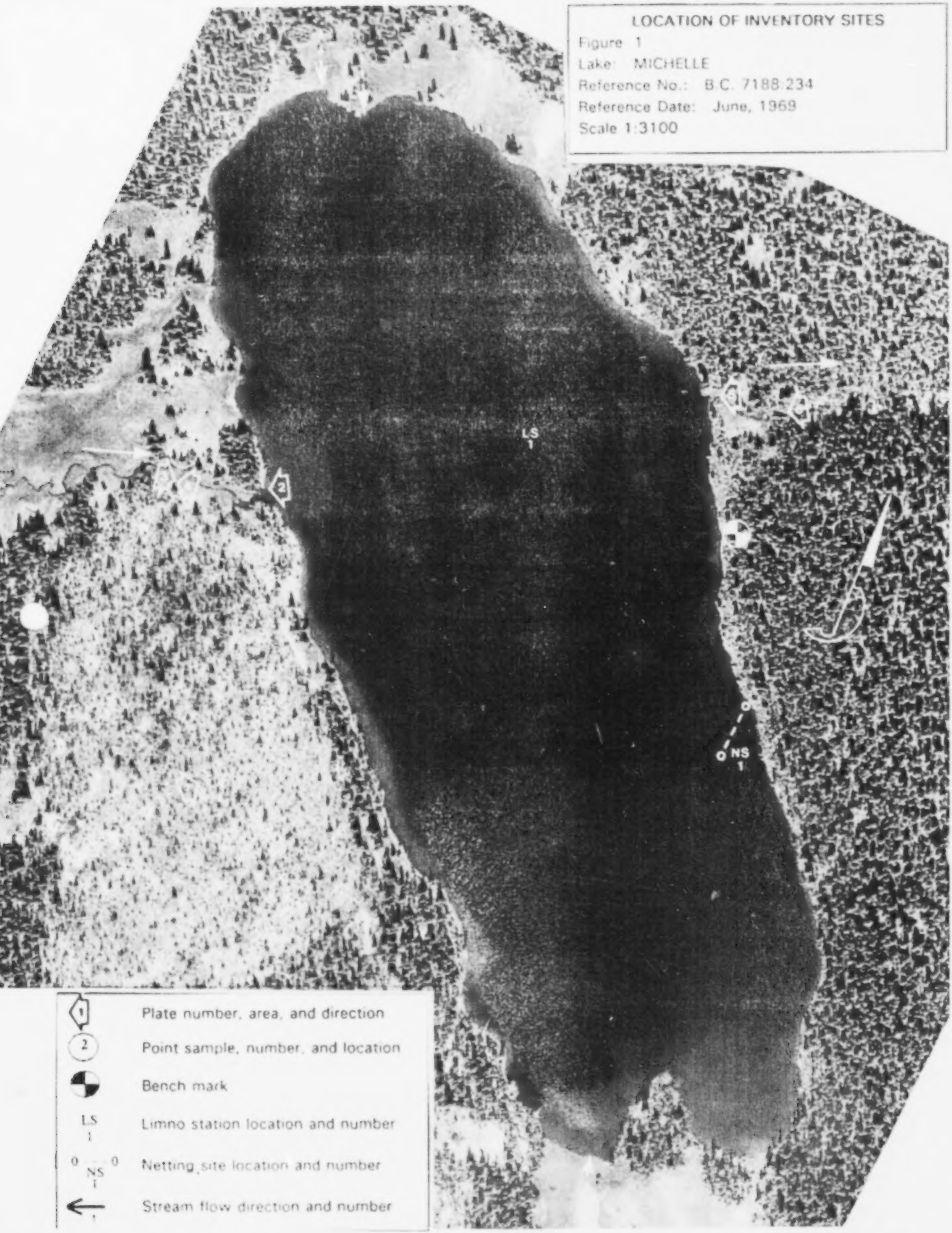
LAKE CATCH SUMMARY

No fish netted.

Minnow Traps:

BAIT: Sardines

#	HOURS	DEPTH (m)	SUBSTRATE	SPECIES	SIZE RANGE (cm)
1	14.25	1.1	fines	1 leech	
2	14.20	1.0	fines	4 leeches	


LOCATION OF INVENTORY SITES
Figure 1
Lake: MICHELLE
Reference No.: B.C. 7188:234
Reference Date: June, 1969
Scale 1:3100
LS 1
2
NS 1
Plate number, area, and direction
Point sample, number, and location
Bench mark
LS 1 Limno station location and number
NS 1 Netting site location and number
Stream flow direction and number

PHOTOGRAPH DIRECTORY

Negative #	Plate #	Description
R8:1 6	1	Aerial view of Otto Lake looking northeast. Arrow indicates location of cutblock (800 m from lake).
R8:19	2	Upstream view of inlet #1 and lake, taken from lake.
R8:17	3	Downstream view of sample site #1, on inlet #1, taken approx. 75 m upstream from lake.
R8:18	4	Upstream view of sample site #1, on inlet #1, taken approx. 75 m upstream from lake.
R8:24	5	Upstream view of outlet, taken approx. 10 m downstream from lake. Note vertical drop (38 cm) from lake to outlet.
R8:22	6	Upstream view of falls/cascade on outlet, taken approx. 50 m downstream from lake. Vertical drop is 1 .7. m. This is a definite barrier to upstream fish passage.

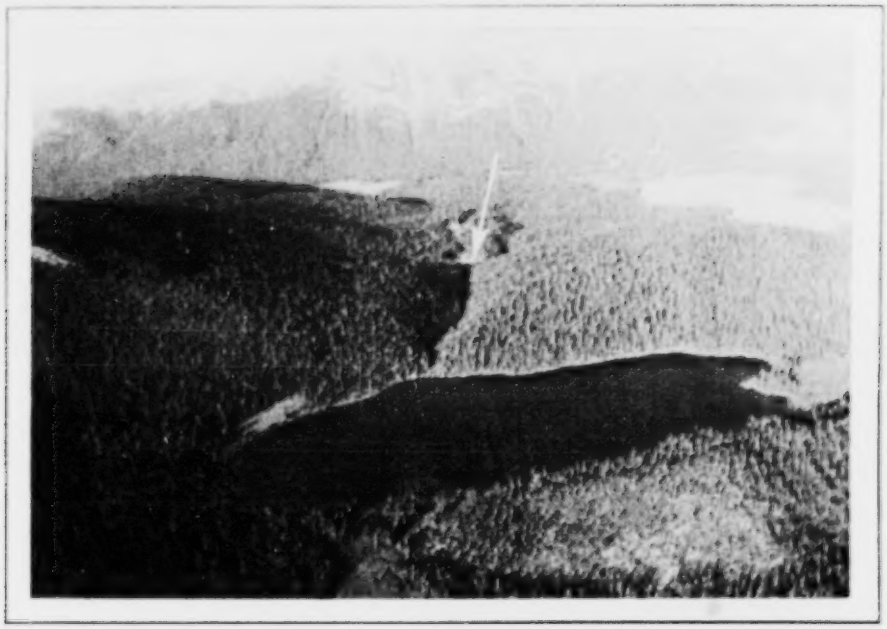


Plate 1: Aerial view of Otto Lake looking northeast. Arrow indicates location of cutblock (800 m from lake).

Plate 2: Upstream view of inlet #1 and lake, taken from lake.

Plate 3: Downstream view of sample site #1, on inlet #1, taken approx. 75 m upstream from lake.

Plate 4: Upstream view of sample site #1, on inlet #2, taken approx. 75 m upstream from lake.

Plate 5:
Upstream view of outlet, taken approx. 10 m downstream from lake. Note vertical drop (38 cm) from lake to outlet.

Plate 6: Upstream view of falls/cascade on outlet, taken approx. 50 m downstream from lake. Vertical drop is 1.7 m. This is a definite barrier to upstream fish passage.

Appendix A

LABORATORY REPORT

Water Chemistry Analysis

ZENON ENVIRONMENTAL INC.
LABORATORY SERVICES

Submitted by:

Address:

Phone No:

Client Sample reference code:
Sampling agency code:

Site (MOSILE) (RENAMED MICHELLE LAKE)

Sample Acquired:
Sample State: As Fresh water
Sample Description: Undefined

This form was prepared on the computer [illegible] as REGULAR
The cost for analysis submitted for this [illegible]

Routine analysis: $
Special analysis: $

Total: $

TRION ENVIRONMENTAL INC
LABORATORY SERVICES

Sample 92017324

Site: NORTH DRAINED WETLAND [illegible]

From: 92/08/11 [illegible]
Depth Range:
Sample State: Fresh Water
Sample Comment:

Parameter Description	Result	Units	Analytical Technique (Storage/Medium/Pres'n)
pH	[illegible]	pH units	Automated pH Meter (00041220/02/01)
Specific Conductance	[illegible]	uS/cm	Cond Meter Siebold (00011160/02/01)
Residue Nonfilterable	[illegible]	mg/l	Grav, 9 cm Buchner, 105C (00530070/02/01)
Res, Filterable	[illegible]	mg/l	Gravimetric 1.0u Filter (00515032/02/01)
Alkalinity Total as	[illegible]	mg/l	Automated Electrometer (00410210/02/01)

ZENON ENVIRONMENTAL INC
E.T.L. LABORATORY SERVICES
Report No: ETL# 10004022

Sample 92017535

Site: WEBSITE

From: 92/08/11 0000
Depth Range: 10.0 to 0.0
Sample State: Fresh Water
Sample Comment:

Parameter Description	Result	Units	Analytical Technique (Species/Medium/Prep'n)
pH	8.1	pH units	Autoanalyzer pH Meter (00004/220/02/01)
Specific Conductance	1000	uS/cm	Cond Meter Siebold (00011/160/02/01)
Residue Nonfilt	2	mg/L	Grav, 9 cm Buchner, 105C (00081070/02/01)
Res (Filterable)	1	mg/L	Gravimetric 1.0u Filter (00701032/02/01)
Alkalinity Total As	2	mg/L	Automated Electrometer (01031210/02/01)

Appendix B

TRIBUTARY STREAM DATA

Appendix B

TRIBUTARY STREAM DATA

System Name: **Unnamed C.** **inlet #1**

System No.:

Site Location: Sample Site #1, approx. 75 m upstream from lake.

Date:	August 11, 1992	Time:	0930 hrs
Channel Width:	2.5 m	Water Temp.:	7°C
Wetted Width:	2.2 m	Stage (flow)	moderate
Max. Depth:	15 cm	Velocity:	0.1 m/sec
Avg. Depth:	10 cm	Field Gradient:	1.0%
Turbidity:	15 cm	Colour:	gin clear

Flood Signs:

Height: 13 cm

Type: woody debris

Substrate Breakdown:

Fines	Small Gravel	Large Gravel	Cobble
5%	5%	10%	75%

Boulder	Bedrock
5 %	-- %

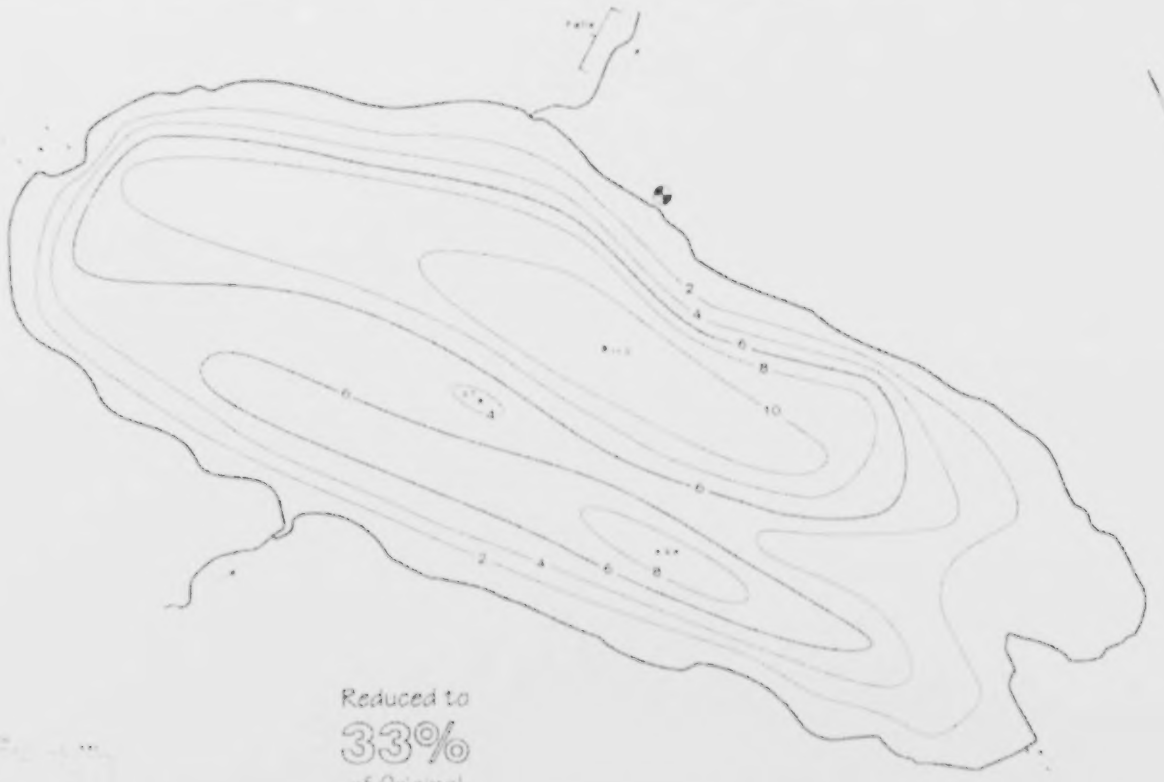
Substrate Compaction:low Sand: -- %

Banks:

	Form	Height	Stability
Right	straight	0.6 m	stable due to rooted vegetation
Left	straight	0.55 m	stable due to rooted vegetation

Comments:

Velocity measured over 3 m.
Field gradient measured over 5 m.
Spawning habitat is poor due to large substrate (cobble), however small pockets of gravel located in faster water were observed in low quantities.
Good rearing habitat noted (overstream vegetation, undercut banks).
Low gradient noted for the length of inlet investigated.



Reduced to
33%
of Original

STATISTICS AT TIME OF SURVEY

FISHERIES BRANCH
CONSERVATION SECTION

Otto Lake
MICHELLE LAKE

1:1500

9.50/8